 

*Architects, Biomedical Engineers, Astronomers, Veterinary Technicians, Statisticians, Computer Programmer, these are just a few of the many exciting occupations that use scientific notation! In this unit we will uncover the meaning behind this new language. Beginning with a study of the key component to understand scientific notation – exponents, and ending with an exploratory look at its real word applications. Google Earth, collaborative challenges, and iMovie will be just some of the cool tools we will utilize in order to guide us on our mathematical journey.*

*RSU#9*

*Kiera J. Timme*

*Scientific notation*

*Mathematics*

*Grade 8*

*Integer Exponents & Scientific Notation*

*• exponents can be used to express numerical values in different, but equivalent, ways*

*• scientific notation is used/can be used to represent large and small quantities.*

*• scientific notation has real-world applications*

*• demonstrate how to convert numbers expressed as decimals to scientific notation and vice-versa.  
• represent large and small quantities using scientific notation.  
• solve problems involving scientific notation.  
• analyze data that contains scientific notation.  
• relate real numbers to their exponential form  
• recognize when, and how, to use the properties of exponents.*

*• Definitions: Exponents, scientific notation, powers, standard notation,  
decimals, integers  
• Critical Details: Properties of exponents, place value, negative, exponents,  
scientific notation operations, magnitude, measurements and units.  
• Applications: Real world use of scientific notation, problem solving strategies, data analysis, finding rates.*

*• How can we use exponents to express numerical values in different, but equivalent, ways?*

*• How and why is scientific notation used to represent very large or very small values?*

*• How is scientific notation applied in the real world?*

*3. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is smaller than the other. For example, estimate the population of the United States as 3 x 10^8 and the population of the world as 7 x 10^9, and determine that the world population is more than 20 times larger.*

*SDSD  
4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.*

*1: Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 3^2 x 3^-5 = 3^-3 = 1/3^3 = 1/27*

***Common Core State Standards******Content Area:*** *Mathematics****Grade Level:*** *Grade 8****Domain:*** *Expressions and Equations****Cluster:*** *Work with radicals and*

*integer exponents.****Standard:*** *1, 3, 4*

***Goal:*** *To create a multimedia fact sheet about state specific endangered species for the U.S Fish & Wildlife Services.****Role:*** *You are a team of Environmental Researchers with a passion for wildlife conservation.****Audience:*** *Department Heads of the Endangered Species division of the U.S Fish & Wildlife Services.****Situation:*** *Raising public awareness of local endangered species.****Product/Presentation:*** *You will use Prezi to create an informative and engaging multimedia fact sheet featuring at least 5 endangered species from the chosen state. All numerical data must be expressed in both standard and scientific notation.****Standards (Criteria from both rubrics - product and presentation):***Product: *Content = 25%, Research & Statistical Data = 25%, Sources = 15%, Mathematical Accuracy = 15%, Attractiveness = 10%, and Effectiveness = 10 %*Presentation: *Preparedness = 25%, Enthusiasm = 25%, Comprehension = 20%, Collaboration with Peers = 15%, Evaluates Peers = 10%, and Time Limit = 5%*

*• Pre-assessment: prerequisite review, review student records, student survey/self-assessment  
• Checking for Understanding: Think, Pair & Share, Onion ring, Clickers, Give one-Get one, Journaling, Note comparison  
• Timely Feedback:  
Self - Students use rubric to self-assess  
Peer - In their role as the audience, students will have feedback cards to score classmates  
Teachers - Copies of the completed presentation and product rubrics will be provided to the students in a timely manner*

*• Glogster: Create a digital poster showing your fellow 8th graders how to convert numbers from standard notation to scientific notations and vice versa  
• Blog: Use the links from the class wiki to find data about very large and very small objects, animals, buildings, etc..Then write a blog posting which includes an image and the measurements of your chosen data in scientific and standard notation.  
• Show Me App: Design an 8 question scientific notation operations quiz for you fellow classmates. Then, using the "Show Me" app, create a step by step answer key for each question.  
• Google Earth & Prezi: Use Google Earth to find population statistics and other information about two different countries. Use this information to create a Prezzi presentation that compares and contrasts the two countries data. This comparison must include an analysis of the two countries. For example: how many times bigger the population (or other figure) of one country is than the other?  
• Wix: Create a website using wix.com that demonstrates how real numbers can be expressed using exponents. The website you create should act as a study guide for anyone who wanted to learn about exponents.  
• iMovie: Create a news report as if the "Properties of Exponents" have just been discovered and you have to explain them to the world.*

*Oral Presentation*

*The Endangered Species division of U.S Fish and Wildlife Services is looking to commission a team of Environmental Researchers to create multimedia fact-sheets that raises public awareness about endangered species in their states. In order to decide which team of researchers they are going to use, the U.S Fish and Wildlife Services wants to see an example of a multimedia fact-sheet for a particular states' endangered species. The fact-sheet must include at least five state endangered species (one bird, one mammal, one plant life, one insect, one aquatic animal). In addition, the fact-sheet must provide the following: 1. Size of the animal/plant, 2. Habitat location and range (size), 3. Image of the Animal, 4. Population size, 5. Rate of population decline/growth over the last 5 or 10 years, 6. An interesting/fun fact, 7. Distance of Migration (if applicable), 8. At least two audio/video components. All measurements must have appropriate units and be given in both standard and scientific notation. Federal and State Endangered Species division officials will decide the winning team. Winners will not only be awarded this valuable commission, they will also been flown out to Washington DC for the National Wildlife Federations annual gala where they will present the final product.*

* *critical thinking*
* *problem solving skills*
* *exponent notation*
* *scientific notation*
* *data analysis*
* *Scientific Notation & Integer Exponents*

***Common Core State Standards Standard:*** *1, 3, 4****Content Area:*** *Mathematics****Grade Level:*** *Grade 8****Domain:*** *Expressions and Equations****Cluster:*** *Work with radicals and integer exponents.*

*• scientific notation is used/can be used to represent large and small quantities.*

*• scientific notation has real-world applications*

*• Preparedness - 25%  
• Enthusiasm - 25%  
• Comprehension - 20%  
• Collaboration with Peers - 15%  
• Evaluates Peers - 10%  
• Time Limit - 5%*

*• Content - 25%  
• Research & Statistical Data - 25%  
• Sources - 15%  
• Mathematical Accuracy - 15%  
• Attractiveness - 10%  
• Effectiveness - 10 %*

*Prezi (Digital Presentation)*

***By what criteria will student products/performances be evaluated?***